

CLAIMS

1. A multi-throttle apparatus, comprising a throttle body that defines a plurality of intake passages corresponding to respective engine cylinders, a plurality of throttle valves that are disposed respectively in said plurality of intake passages, a throttle shaft that supports said plurality of throttle valves to be simultaneously opened/closed, drive means that includes a motor that rotatably drives said throttle shaft, and a return spring that returns said throttle valves to a predetermined angular position, characterized in that said drive means is disposed to apply a driving force to said throttle shaft at a location in a mutual interval close to the center, said mutual interval being one of mutual intervals between said throttle valves disposed at a plurality of locations, said return spring is disposed close to a location to which the driving force of said drive means is applied, and said throttle body includes bearings that support said throttle shaft in said plurality of mutual intervals between said intake passages.

2. The multi-throttle apparatus according to claim 1, characterized in that said throttle shaft comprises two throttle shafts separated by the area as a border to which the driving force of said drive means is applied, and said two throttle shafts are connected so as to rotate coaxially and integrally.

3. A multi-throttle apparatus, comprising a throttle body that defines a plurality of intake passages corresponding to respective engine cylinders, a plurality of throttle valves that are disposed respectively in said plurality of intake passages, a throttle shaft that supports said plurality of throttle valves to be simultaneously opened/closed, drive means that includes a motor that rotatably drives said throttle shaft, and a return spring that returns said throttle valves to a predetermined angular position, characterized in that said drive means is disposed to apply a driving force to

said throttle shaft at a location on one end of said throttle valves disposed at a plurality of locations, said return spring is disposed close to a location to which the driving force of said drive means is applied, and said throttle body includes a bearing that supports said throttle shaft in said mutual interval between said intake passages.

4. The multi-throttle apparatus according to any one of claims 1 to 3, characterized in that said return spring includes a plurality of return springs that are disposed along said throttle shaft, and apply energizing forces different from each other, and a return spring of said plurality of return springs that applies the largest energizing force is disposed close to the location to which the driving force of said drive means is applied.

5. The multi-throttle apparatus according to any one of claims 1 to 4, characterized in that said throttle body is comprised of a plurality of throttle bodies that respectively define said plurality of intake passages, and are connected to each other in the direction in which said throttle shaft extends, and said plurality of throttle bodies comprise an engagement section that engages said bearing.

6. The multi-throttle apparatus according to claim 5, characterized in that said plurality of throttle bodies are connected with each other via a spacer that adjusts the mutual separated distance.

7. The multi-throttle apparatus according to claim 6, characterized in that said spacer is formed so as to fix said bearing to said throttle body.

8. The multi-throttle apparatus according to any one of claims 1 to 7, characterized in that said plurality of throttle valves are formed such that the cross section thereof tapers off to the tip thereof as departed from the rotation center.